Space Weather Forecast

Issued on Tuesday, 20 February 2024 at 00:36 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: Ongoing chance of Minor Solar Radiation Storms (R1). Slight chance of Minor Geomagnetic Storm (G1) Tuesday 20 February.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has remained low over the UTC day of Monday 19 February with X-ray flares confined to Common-class, peaking with a flare at 19/0940UTC from a large sunspot region near the eastern solar horizon.

There were five sunspot regions on the facing side of the Sun, with the nominal threat of flares dominated by a large departing region in the northwest, and by a second arriving in the northeast. Other sunspots were relatively magnetically simple and largely unchanged in the 24 hours.

A 'prominence eruption' (arc of plasma leaving the Sun) was noted on near infra-red imagery around 19/0100UTC. A 'disappearing filament' then left the southwest disc just before 19/1800UTC. The former has been analysed and does not intersect the ecliptic (i.e. there is no effect on Earth), however analysis to determine any effects arising from the latter is awaiting imagery. Finally, late in the period around 19/2300UTC, a dimming and probable CME was observed from the vicinity of the western solar horizon sunspot region, at the same time a prominence was seen to depart the southwestern solar horizon, with imagery confirming any CMEs pending in both cases. At the time of writing, no new Earth-directed Coronal Mass Ejections (CMEs) were noted.

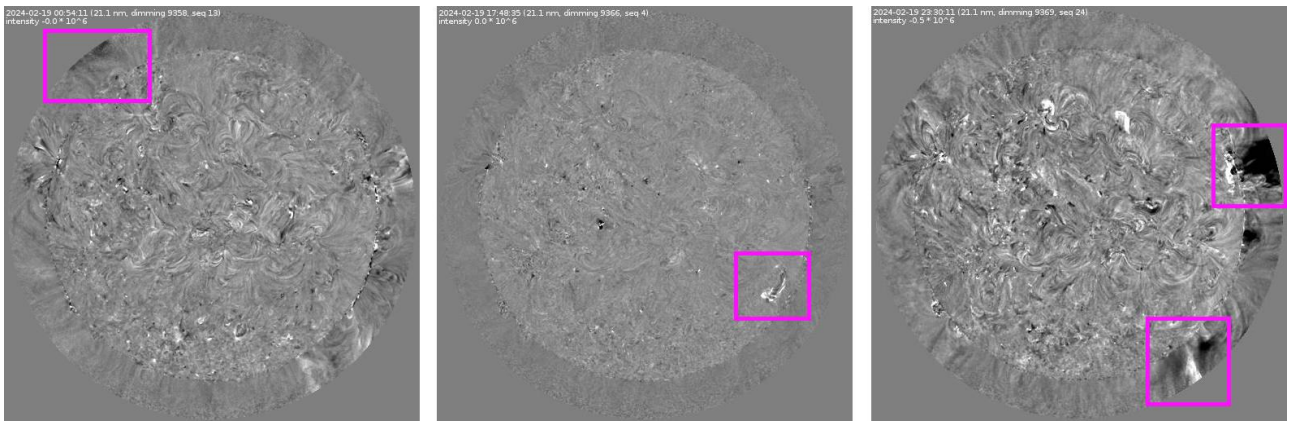

Figure 1: SIDC ROB processed time-integrated extreme UV ‘dimmings’ (sometimes asscoiated with CMEs) seen in the 24 hours, with main events shown boxed in magenta. The leftmost is confirmed as missing Earth, however the remaining three are yet to be assessed.

Solar Wind / Geomagnetic Activity: Solar winds were reflective of a slow solar wind regime. The solar wind speed was steady at background levels. The number of particles in the solar wind

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.

showed a slight rise over the same period, but always remaining within typical background. The associated magnetic field was smooth and stable within normal levels, with a gradual rotation of the north-south component from co-aligned to anti-aligned with Earth's field (i.e. usually from lesser to greater geomagnetic effect, although in this case the small magnitudes involved produced little difference).

The net result of the above solar wind measures was for provisionally quiet geomagnetic activity throughout.

Energetic Particles / Solar Radiation: Solar radiation was just above resting background levels but on a continuing declining trend, with no new enhancements having been seen since 16 February.

Four-Day Space Weather Forecast Summary

Solar Activity: Low activity is most likely to continue, but with a daily chance of rising to Moderate. This chance is rated roughly constant through the four days, with arriving eastern solar horizon regions roughly compensating for western losses.

Solar Wind / Geomagnetic Activity: A CME which left the Sun on 16 February may glance the Earth during the first half of day one, Tuesday 20 February, but with low confidence. Solar wind speeds are otherwise expected to remain at ambient levels, with no high speed streams forecast to connect with the Earth.

Geomagnetic activity is forecast to be mainly quiet, with a slight chance of isolated Minor Geomagnetic Storm intervals (G1) early on Tuesday 20 February due to the potential CME arrival.

Energetic Particles / Solar Radiation: Solar radiation levels will continue to gradually ease to resting background, but with a slight chance of further enhancement until around midweek UTC should any appropriate flares occur from a sunspot group just over the limb or from the large (narrowly) front-sided region approaching it.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	35	35	35	35
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	2	2	1
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2024. All Rights Reserved.